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New Media Art

The idea of art is no more than 500 years old. No word in any language before that distinguishes between art and ordinary making.

Art emerges as something special only with its claim to autonomy.

The Renaissance scholar is what provides the artist with the model of an autonomous status elevated above that of the craftsman.

Art emerges as a learned profession rather than a manual activity that shares in the traditional devaluation of manual work in the eyes of the elite.

Art becomes autonomous with its preoccupation with technique.

Technique is to the artist what taste is to the cultivated patron.

Like the linguistic and historical knowledge of the Renaissance scholar, taste and technique are products of cultivation, of culture.

But, until recently, art retains its connection with manual skill,

apprenticeship, and mastery of material media.

Technique remains connected with *techne*, in the ancient Greek sense of knowledge that guides the process of making.

At its origin, artistic technique is the offspring of *techne* and cultivation.

The ancient Greek philosophers would have regarded this as a monstrous chimera, given the opposition they saw between *techne* and the knowledge of the philosopher, the mathematician, the statesman, or the poet.

With the Renaissance, mastery of material becomes the basis of the artist's claim to autonomy. Material is matter as shaped by history.

Material is the medium of artistic expression. Like all matter, material must be shaped by physical skill.

But as the historical deposit of past acts of artistic shaping, material is matter whose expressive possibilities change over time.

The artist's mastery of material is both physical and historical.

Mastery of artistic material is historical in the same sense that the Renaissance scholar is master of the history of his field.

Though its claim to the status of scholarship is what liberates art from craft, it is merely the first chapter in the story of autonomy.

Other chapters in the story of autonomy: rise of the museum as

detached cultural space, development of the art market, and emergence of the art academy.

Still autonomy continues to depend on the artist's technique, on specific modes of mastery of aesthetic material, both physical and historical in character.

The development of modern technology introduces a new dimension into the nature of artistic technique.

Modern technology begins by substituting machinery for the bodily activity previously responsible for shaping matter.

Modern technology then proceeds to apply machinery to forms of making that have no bodily equivalent, e.g., chemical and electrical processes.

The second category of modern technology - processes of shaping without bodily precedent - leads to the creation of new media.

The earliest forms of new media: printing, photography, and cinema.

Benjamin's age of mechanical reproduction is not reproductive at all. It involves new forms of productivity beyond bodily production.

Printing, photography, and cinema may produce multiple copies, but these copies are *sui generis*, and not reproductions of an original.

With the new media, mastery of material leaves craft skill behind. Artistic technique and (modern) technology are now fused.

The new media artist, including the photographer and filmmaker, is neither a scholar nor a craftsman, but an organizer and operator.

The photographer organizes camera, chemical bath, negative, enlarger, paper etc. into an ensemble of processes resulting in the photo.

The photographer operates the camera, the enlarger, the print drier, and so on, all of which are interposed between his/her body and the artwork.

Organization and operation, more conceptual than physical in character, take the place of the act of shaping material by the body.

In cinema the director is organizer of the film - of cameramen, sound engineers, editors, etc., who operate equipment that shapes material.

Since organization, coordination take over the function of craft technique, new media art is “conceptual” from the beginning.

Photographer and director are early examples of “conceptual” artists. Still, conceptuality fully comes into its own with computer media.

The conceptualism of film and photography reaches its culminating expression in the formal symbolic tools of computerized media art.

The early phase of modern technology interposed physical machine processes between maker and material. The current phase interposes symbols.

Symbols (instructions in programming language) are often linked to

physical machines in cyberart (printers, computer screens, speakers, and so on.)

The point is that the artist faces symbols, but not the machines they operate, directly. In this, cyberart differs from older new media art.

The cyber artist may work with any one of a nested hierarchy of formalized languages - machine language, programming language, application.

But in spite of carpel tunnel, eyestrain, back problems, and so on, this is essentially brain work.

The point remains, however, that what makes cyberart unique is the working of material through the intermediary of symbolic languages.

Cyberart is conceptual, but its conceptuality is more akin to mathematics, physics, demographics, and microbiology than Renaissance scholarship.

The philosopher most relevant here is Leibniz with his plan for an *ars combinatoria* & *characteristica universalis*.

There is a direct line of filiation from Leibniz to Peano to Frege to Russell to Godel to Turing and the earliest programming languages.

Lebnizian aesthetics: beauty, harmony, order, perfection, clarity of perception. There must be such a thing as a beautiful line of code.

Does the cyber artist look for beautiful code the way the physicist looks for beautiful theories? Probably not.

Cyberart is still visual, sonic, or tactile in character. Cyber-beauty still conforms to Aquinas' definition: That which pleases when seen.

The "material" of cyberart is still physically sensuous in character. The purpose of formalized languages is simply to work this material.

But hooked up to the right machines, formalized languages generate the material they work: pixels, bar codes, 3D spaces, electronic tones.

But then even older new media art generates new material - the print is the product of photography, for example, not a pre-given medium.

Virtuality

The Latin word from which we derive the English word "virtual" is *virtus*, which is itself derived from the Latin *vir*, meaning man.

This association of *virtus* with strength or power lies at the center of the philosophical use of the term.

The Romans translated the Greek word *dynamis* as *virtus*. *Dynamis* has a rich history in Greek philosophy.

Dynamis appears in Anaximander, Anaximenes, and Plato, but its most influential treatment by far is in Aristotle.

In Aristotle's book, *The Metaphysics*, the two meanings of *dynamis* that are philosophically relevant are "power" and "potentiality."

For Aristotle, power is the source of motion or change. Aristotle says that potentiality cannot be defined but must be grasped by analogy.

Potentiality is to actuality (*dynamis* to *energeia*) what sleeping is to waking and the ability to walk to the act of walking.

The transition from potentiality to actuality occurs either by “art” or by an “internal principle.”

Art, for example, brings the human form out of the block of stone. By contrast, the mature oak emerges from the acorn by internal growth.

The transition from potentiality to actuality is a central paradigm of Aristotle’s metaphysics of substance (*ousia*).

In that transition, actuality has logical and ontological precedence. Only something actual can function as cause of motion or change.

This is why Aristotle says that there must exist a primary Unmoved Mover, fully actual being that acts as the lure of desire.

Still *dynamis* is also a principle of being, at least in things that change, both natural and humanly made.

This is an important point because it will characterize the relationship between virtuality and actuality down to the present.

Dynamis (*virtus*) is as real as *energeia* (*actus*), virtuality is as real as actuality. But the actual has priority over the virtual.

That priority is ontological. Without actual reality, potential or virtual

reality would have no hold on being.

Pure actuality (*actus purus*), on the other hand, has no need of potential being.

For the medievals thinkers, this is one reason why God is superior to his creation.

On the basis of the old word, *virtus*, the medieval philosophers coin two new words.

Virtualis - potential or effective - and *virtualiter* - having being in a virtual manner.

The second word, *virtualiter*, becomes a technical term in the work of the scholastics. That story is complicated. But the key point is:

Virtual being is now distinguished, in Aquinas, Scotus and others from potential being.

The nature of the distinction varies. Aquinas applies the concept of virtual being to the existence of elements in a mixture.

Elements exist virtually, not because of a potential to separate from the mixture, but because they contribute their powers to the mixture without appearing as separate substances.

Earth is *virtualiter* in marble because it is what makes marble heavy, not because it is potentially the independent element, earth.

Virtuality for Scotus is more complicated than for Aquinas. It is related

to Scotus' thesis that being is univocal, not analogical.

In other words, being means the same thing whether we are speaking of God or creatures, of substances or attributes

Scotus introduces the concept of virtuality when he discusses the "transcendentals", i.e. the categories that lie above any genus.

The transcendentals are being, unity, truth, and goodness. How are they related to one another if being is univocal, if it is always said in the same way?

Scotus says that unity, truth, and goodness are coextensive with being, yet each adds something to it.

Being is always said in the same way, but there is more to say about being than is contained in that concept.

For Scotus, the other transcendentals are present within being, not as parts of its essence (*in quid*), but in a virtual manner (*virtualiter*).

Scotus' idea of virtuality is the opposite of what the word "virtual" came to mean - the sort of, but not quite real.

For Scotus, virtuality is augmentation rather than impoverishment.

The medieval philosophers draw a distinction between potentiality and virtuality, though they contrast both with actual being.

In his book, *Bergsonism*, Deleuze identifies Bergson, especially in *Matter and Memory*, as the premier modern philosopher of virtuality.

For Bergson, the model of virtuality is what he calls “the pure past.”

Bergson contrasts the pure past with the actual memory-image that makes the past available to our living, conscious present.

Say I meet someone on the street whom I know, but I can’t remember from where. Was it my freshman year of college, or my stint in the army, or …

Bergson says that I am searching in the pure past for the region or stratum of memory in which the person is located.

He belongs to my pure past, or I would never be able to locate him, but that past is virtual; it is not a part of my actual present.

Gilles Deleuze is the 20th century philosopher who most explicitly takes the idea of the virtual as a central theme.

The Stoics, Scotus, Spinoza, and Bergson are Deleuze’s most important philosophical influences here.

But he is also deeply influenced by the directors Welles, Zanussi, Renoir, Ophuls, Tarkovsky, Fellini, and Visconti.

It is probably easiest to see what Deleuze makes of virtuality in a chapter in volume 2 of his *Cinema*, titled “Crystals of Time.”

For Deleuze, the theme of cinema is time.

Prewar American cinema develops an indirect image of time as reflected in action; post-war European cinema develops a direct time-

image.

Deleuze doesn’t use this language, but the direct time-image is nonlinear. It breaks with the narrative conventions of realist story telling.

Realist American cinema is focused on action that involves a milieu that poses a problem to the main characters in the form of a task.

Characters must discover that task, acquire powers necessary to complete it, battle opposing forces, and transform the initial situation.

Just as time is grasped through linearity of motion in Western philosophy, time is grasped through linearity of action in realist cinema.

The direct time-image is nonlinear. Characters unable or unwilling to master situations float in a time that does not progress but cycles.

They live in a present that is simply the most compressed expression of the pure past. They meander in time, observing rather than acting.

There are two, not one, streams of time. In one stream, the razor’s edge of the present gnaws into the future, converting it into the past.

In the other stream, the past piles up as series of memory-sheets, each of which is a compressed expression of all the sheets preceding it.

The present of the second stream is actual, but it is merely the

process of passing, of converting future into past.

The present as most compressed form of the past (virtuality), and the present as the act of passing (actuality) are the two faces of time.

The two symmetrical facets of time are mirror images or, when elaborated, the seed of a growing crystal, the focal point of the direct time-image.

The first great work of the cinema of the direct time-image is American, not European, Welles' masterwork, *Citizen Kane*.

Reflections in the shattered snow globe in the opening scene; multiplication of Kane's reflection in facing mirrors in the penultimate scene.

These are symbols or signs of the crystalline structure of time. The second image is elaborated in *Lady from Shanghai* in the fun house scene.

In the house of mirrors, the reflections of the protagonists are infinitely multiplied, converting actuality into virtuality, and vice versa

The point is not that the virtual is somehow superior to the actual.

Deleuze is often misinterpreted as saying that, as articulating a thesis of the primacy of the virtual.

But his claim is that the virtual and the actual are two halves of reality, and that neither can subsist on its own.

The present as the act of passing and the present as the most contracted expression of the past are one and the same present.

The actual and the virtual are mirror images, two facets of a crystal that they jointly comprise.

Virtuality + Actuality = Reality so that Reality > Virtuality and Reality > Actuality

This differs from Aristotle and Scotus only in that Deleuze drops the thesis of the primacy of the actual.

But he does not make the opposite error of asserting the primacy of the virtual.

Virtual Reality

What does all this have to do with “virtual reality” in the meaning that this expression currently has?

Let’s accept Jaron Lanier’s claim to have invented the phrase in the 1980s, even though it is attested as early as the 1920s in Artaud.

Larnier probably was the first to use the expression to refer to immersive computer-generated environments.

But clearly he was not extending the thinking Scotus, Bergson, or Deleuze to the phenomenon of computer simulation.

Yet these earlier philosophical reflections are eminently applicable to what Larnier called virtual reality.

Lanier was 5 years old when Ivan Sutherland, inventor of the Graphical User Interface, published a paper in the Journal of the Information Processing Techniques Office, ARPA.

The following quotations are from taken from that paper, “The Ultimate Display,” a 3-page treatise written in1965:

“…the task of the display is to serve as a looking-glass into the mathematical wonderland constructed in computer memory…”

“…it should serve as many senses as possible.”

“The ultimate display would, of course, be a room within which the computer can control the existence of matter.”

“A chair displayed in such a room would be good enough to sit in… and a bullet displayed in such a room would be fatal.”

“With appropriate programming such a display could literally be the Wonderland into which Alice walked.”

Lanier may have coined the expression “virtual reality,” but Sutherland has claim to being its inventor and earliest theorist.

In 1968 Sutherland implemented the earliest version of VR with wire-frame graphics and a head-mounted display.

An important aspect of Sutherland’s description of the ultimate

display is its metaphor of “a looking glass into a mathematical wonderland.”

Note that the mathematics functions off-stage, since Sutherland’s conception of wonderland is an environment that appeals to the senses, ultimately or ideally to the full suite of human senses.

The ultimate display is a looking glass that, of course, reflects a virtual image (though Sutherland does not use the word “virtual” in this context.)

The display would make available to the senses a world of objects not constrained by ordinary physical laws.

Such a world (or worlds) might obey new laws encoded in the off-stage mathematics.

Still the display as looking glass fits with Deleuze’s account of the “crystals of time” as reflected actual-virtual pairs.

Remember that the cinematic expression of such pairs is the doubling of reality by mirrors (Welles - *Citizen Kane*, *Lady from Shanghai*.)

Reflected and reflection, actual and virtual are two connected but ultimately divergent forms of reality.

Aside from the mirror-metaphor in Vol. 2 of *Cinema*, Deleuze devotes a book to the looking glass world of Lewis Carol, *Logique du sens*.

In the world Alice enters when she steps through the mirror, the laws of physics, but also the laws of ordinary logic, are subverted.

Alice is caught up in paradox, a logic of events rather than things.

One becomes bigger (than one's earlier size) in the same moment that one becomes smaller (than one's later size).

Events - becoming bigger, becoming smaller - are not things, but play on the surfaces of things. Having been cut is not a physical property.

The knife, my arm, and the knife's movement along my arm are physical. But my arm having been cut is not physical; it is an ideal state, a sense.

The Stoics were the first philosophers to make this distinction, and to begin to develop a logic of sense.

From Deleuze's Stoic perspective in *Logique du sens*, physical reality is actual, while the realm of events, sense, ideal meaning is virtual.

Alice steps through the looking glass into a virtual world.

The logician, Lewis Carroll, is the second great explorer, after the Stoics, of the realm of sense and its paradoxes.

Citing Sutherland again: "There is no reason why the objects displayed by a computer have to follow the ordinary rules of physical reality…"

"The kinesthetic display might be used to simulate the motions of a negative mass."

"The user of one of today's visual displays can easily make solid

objects transparent - he can “see through matter!”

” Concepts which never before had any visual representation can be shown…”

“…imagine a triangle so built that whichever corner of it you look at becomes rounded.”

Negative mass, seeing through matter, a shape that’s a triangle except when we look at it - this is why Sutherland uses the word “wonderland.”

All this can be coded in the mathematical language of the computer controlling the display. The paradoxes are surface effects of deep code.

But this is precisely the way Deleuze characterizes the paradoxes of Alice’s adventure - surface effects, events sliding over the surface.

Paradox is a creature of language - in this case programming language - a matter, not of things, but of senses (meanings) of propositions.

It’s interesting to consider the family tree: Carroll’s symbolic logic, the propositional logic of Frege and Russell, and computer code.

Computer hardware is able to assume any of an enormous, but finite, number of possible physical states.

Each physical state is a differential, and normally changing, distribution of electrical charges.

Computer code constrains the plasticity of the physical machine.

The physical machine has different surface effects depending on the way it is constrained by code.

Constrained one way, it simulates the operation of a typewriter, constrained another way it simulates the operation of a film studio, etc.

This was Turing's discovery. A universal Turing Machine (universal because it has a notionally infinite tape) can simulate any other machine.

The real machine has virtual effects on the surface level, the level where the final user interacts with the machine.

Physical processes occurring in depth give rise to surface virtual effects. But this is just the point the Stoics make.

Sutherland's Wonderland is an artifact of Stoic "sense" - a virtual reality where physical impossibility & linguistic paradox proliferate.

Why Deleuze's focus on language? Virtuality is not a product of language. It is an ontological, not a linguistic category.

As for Bergson, in the final analysis, Deleuzean virtuality is an aspect of time.

Time is creativity and life - the "profound, nonorganic life of the world." Deleuze is a vitalist, an animist, and a hylozoist.

Still the virtual plane of events is inherently expressible in language as the meaning, or ideal content, of propositions.

This is a major theme in 20th century philosophy - in Frege, Meinong, and Husserl especially.

Between proposition as linguistic entity and the state of affairs it denotes, there is the meaning of the proposition, the *way* it denotes.

Meanings are ways of “seeing as,” e.g. seeing the pen *as* lying on the table. My old professor, J.N. Findlay, called them “slants” on things.

Husserl calls them *noemata* (literally “thought objects”). He says that the tree burns, but the *noema* of the tree does not.

Deleuze calls meaning, or sense, forms of “extrabeing.”

It would be better to call them forms of “interbeing,” since they are located between propositions and things.

What is the special significance of Carroll’s books when every book consists in propositions that express meanings?

It is that they reflect on the nature of meanings, not philosophically, but by humor, pun, and paradox.

Wonderland and the looking glass world are places where sense runs rampant, where it replaces things and states of affairs.

The fact that Alice takes senses to be things is responsible for a great deal of her confusion.

What links senses with events is the significance of the verb in senses - *lying* on the table, a *flowering* plant, even a *greening* tree.

We understand something *as* something when we grasp the verb that characterizes it - the manner in which it appears.

In other words, what happens to it or what it makes happen.

Deleuze says that the realm of sense is that of a “mad becoming.” “Mad” because the logic of sense is not the logic of things.

Do cats eat bats, or do bats eat cats? In a moment of lucidity, Alice says it doesn’t matter how you answer that question when you don’t know which is true.

Contrary, even contradictory, meanings can coexist when regarded on their own, rather than as belonging to things or states of affairs.

The “round square” has a perfectly definite sense, though it is impossible for such a thing to exist.

Meinong says that meanings subsist rather than exist. Subsisting is the mode of being of the contrary, the contradictory, the absurd.

The computer screen is a surface dividing, but also connecting, the real and virtual worlds, like Alice’s looking glass.

How does the computer generate meanings, or senses, when these are semantic entities and the computer is a syntactical device?

John Searle has raised this problem in his critique of AI, in the

Chinese Room thought experiment.

A room contains books with look-up tables, and a single person who does not know Chinese.

Cards with Chinese characters are passed to the person in the room through a slot in one wall. The person looks at the characters, finds the sequence of characters in the look-up tables, and writes down the characters linked by the table to the ones on the card.

She passes a card with the resulting symbols through the slot in the wall to the person on the other side. She then receives another card with Chinese characters.

By repeating this process, the person in the room carries on a conversation in Chinese without knowing the meaning of any of the characters.

The room is a computer, the look-up tables are memory, and the person in the room is the processor. Searle's point: nothing in the room understands Chinese.

The computer is a syntactical device without semantics. How then could it serve as our entry to a virtual world, a realm of semantic sense?

The answer lies in the activity of the programmer. The programmer manipulates the syntax of computer code so that the result is semantic sense.

For example, he programs the machine to draw a cube on screen, by

knowing what a human viewer will interpret (*see as*) a cube.

Whether it is possible to automate the programming process in such a way that syntax conserves or produces semantics is an open question.

The guess that this is possible is what guides the program of classical AI. But all that we need for our purposes is the programmer's semantic abilities.

The computer has a semantics for the same reason Carroll's books have one - both were authored by people who understand sense (and nonsense).

Virtual Worlds

Virtual worlds are worlds. Understanding the art made there requires an understanding of what a world is.

"In a substantial composite, just as analysis does not end until a part is reached which is not a whole … so likewise synthesis does not come to an end until we reach a whole which is not a part, that is to say, a world." - Kant, Inaugural Dissertation

The problem that both analysis and synthesis presented to Kant was that of completing an infinite task in a finite time.

Neither the simple part nor the world as an ultimate whole can be given in sense experience. They are Ideas of pure reason.

In the *Critique of Pure Reason*, Kant will tell us that their only legitimate function is regulative in character.

The idea of a world gives us, not knowledge, but a rule that tells us to carry on with synthesis no matter how far we have gone.

What for Kant is a regulative Idea, is for Husserl something we directly experience. Husserl calls the world an “horizon.”

We do not experience the world in the same way we experience objects. Objects are given within the context of a world-horizon.

The sense of belonging to a world is part of what it means to be an object; it is an aspect of the object’s givenness.

The object presents itself as something that can be surpassed, something that refers to other things, ultimately to the totality of things.

Only this totality is open in the sense that it can never be given all at once. It is infinite, which is to say infinitely open.

For Kant, the infinity of the world is what makes it an Idea, but for Husserl that infinity is a matter of concrete experience.

It is true that we cannot reach infinity by serial synthesis, since that would demand an infinite time.

But we can experience the infinite openness of the world all at once, with every experience of finite things.

The world as horizon is the ground from which every experienced thing emerges, and to which it returns when we move beyond it.

This is the phenomenological world, the world as something given, and most fundamentally given in sense-experience.

The world gives itself as arrayed around the living body. The body introduces points of orientation - above, below, right, left, etc.

The mobile body is exploratory. It can move beyond every finite object of experience in the act of probing the world.

The experience of being-in-a-world through a living body is that of immersion.

To be immersed means to be in the midst of things, rather than holding them at a distance. Without a body, immersion would be impossible.

Immersion is one of the essential characteristics of virtual worlds.

In virtual worlds the avatar is the living body. There are complex relations between operator's body and avatar that need exploring.

Still, the simple fact is that the user identifies with her avatar on a profoundly somatic level.

The avatar spins around and the user becomes dizzy. The user is tired and has her avatar sit down.

Any form can serve as an avatar as long as the user can move it, and

as long as the virtual world reveals more of itself with movement.

The most abstract but still bodily form of the avatar is the simple mobile point of view.

In a way, Husserl (in his late work), Heidegger, and Deleuze are all engaged in the same project - the project to get beyond an ontology that begins with an exhaustive division of Being between objects and the subject experiencing them.

Objects and experiencing subject are forms of actuality, but not everything in reality is actual.

The horizon of the lifeworld in Husserl is virtual. Or as Heidegger would say, Being comes like a thief in the night.

Or Shakespeare: There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy. Except “more” is not a thing.

It’s interesting that Deleuze found Husserl a valuable thinker considering the dismissal of phenomenology by most of Deleuze’s late twentieth-century colleagues.

Deleuze even goes so far as to ask whether phenomenology might not be the “rigorous science of sense.”

The whole significance of Husserl’s transcendental reduction is that it “brackets” the world of the natural attitude so its sense might emerge.

The lifeworld is the world as it appears to us, the world, not of things and states of affairs, but rather of meanings.

It’s the virtual dimension of the world that concerns Husserl. What Deleuze couldn’t accept is the idea that subjectivity constitutes sense.

For Deleuze the world results from the play of pre-individual, and therefore pre-subjective, singularities.

But if we strip phenomenology of the thesis of transcendental idealism, it becomes compatible with Deleuze’s project.

Regarded phenomenologically, the world is not a totality of objects, but an horizon of sense.

This means that we should approach virtual worlds phenomenologically. When we do, immersion becomes salient as an essential characteristic.

So does interaction.

Husserl says that the lifeworld has a “style,” a framework of causal regularity prior to the mathematized causality of science.

For Deleuze, the causal connections between “events” are indirect. Events are surface effects of physical processes occurring in the depths.

Relations between events are only quasi-causal since they are effects of relations between physical processes occurring deep down, while events play on the surface.

This is the way to understand causality in virtual worlds. Husserl is right in suggesting that any world must have a causal style.

But in computer-simulated worlds the style connecting virtual events is the effect of physical causal connections at the hardware level.

The programmer manipulates these hardware events (distribution of voltages) in creating the experience or illusion of a causal style.

In this sense, the virtual world is not the lifeworld, since, according to Husserl, the lifeworld is not the effect of underlying physical processes.

Still without the illusion (virtual experience) of causality, there would be no illusion of a virtual world.

The avatar shares a virtual world with other avatars as well as “inanimate” virtual objects because of apparent mutual influence.

Virtual causes must have virtual effects if the virtual world is to have a “style,” if what happens within it is to be at all intelligible.

Heidegger’s concept of “dwelling” is also useful here. We dwell in a world along with other things because they are “ready to hand,” in other words, available for causal interaction.

Immersion and interaction are not characteristics specific to virtual worlds. They are necessary characteristics of any world at all.

The pluralism involved in the concept of virtual worlds is consonant with the most ancient and modern cosmologies.

According to Epicurus, there are an infinite number of worlds existing simultaneously within the universe.

Because space and the atoms streaming through it are infinite, and because the atoms “swerve” and so make contact with one another, every possible configuration of atoms exists.

A world is a configuration of atoms separated from other configurations by stretches of void left empty when atoms bind together.

Epicurus’ conception is repeated in current theories of an ergotic universe, which is merely one of many multiple worlds theories.

The cosmological multiverse and the virtual metaverse both involve the idea of a hyperspace supporting a plurality of worlds.

We should restore the phrase “cyberspace,” in danger of dropping out of our lexicon, and use it to refer to the whole electronic matrix that sustains virtual worlds.

The Six Dimensions of Virtual Art

There are six dimensions of virtual worlds: immersion, interaction, ambiguity of identity, environmental fluidity, artificial agency, and networked collaboration.

This is a cluster of dimensions or defining characteristics that *collectively* distinguish virtual worlds from other new media.

These are also the dimensions of virtual art; at least to the extent that virtual art expresses the uniqueness of its own medium.

Abstractly, dimensions are vectors along which data varies in accordance with a rule or set of rules.

So it seems that dimensions in the sense used here are more than simple “properties” or “characteristics.”

Since they must be coded in programming language, immersion, interaction, and so on must have an underlying mathematical structure.

They are dimensions in the mathematical, though not spatial, sense of the word.

Ambiguity of identity results from the fact that our bodily presence in the virtual world is mediated by a digital representation.

Dwelling within a world involves being present in a body.

The body both constitutes our perspective on things and makes us present to other embodied experiencers.

Though personal identity can be a very complex construction, its ultimate foundation is continuity of bodily presence.

Digital bodies, and the names that uniquely identify them, can be altered, multiplied, discarded, or exchanged at the will of the user.

Since bodily presence is open to such radical discontinuity, the identity of the virtual person is protean and ambiguous.

Such ambiguity extends to indicators of age, gender, race, and even

biological species.

It is all well and good to say that identity is a construction, but a construction by whom?

If we have no identity before one is constructed, then “we” (“you” and “I”) cannot be the constructors, since we are the results of construction.

This is why Deleuze says that the transcendental field is pre-individual and pre-conscious, consisting rather of “points of singularity.”

Points of singularity are primitive events: it greens, it struggles, it grows, it shrinks, and so on.

When these singularities form a particular kind of series, an individual is the result.

Difference (the divergent singularities) is more basic than identity (the individual that emerges when the singularities form a series).

Being secondary, identity is always threatened. It can alway revert to the pure singularities underlying it.

Even the body as the foundation of identity can revert to the singularities underlying it.

In Wonderland, Alice confronts the ambiguities of identity, including the threat of its loss.

She loses the sense of continuity with her self outside of Wonderland.

The ability to alter identity in virtual worlds may express the shifts in identity that are especially pronounced in the current period.

But such alterations may also serve as attempts to achieve mastery of identity by making oneself the origin of shifts.

Maybe that's the way we should regard the use of multiple avatars in SL and other virtual worlds - as attempts to master fluid identities.

Environment fluidity is to the external virtual world what the protean character of identity is to the internal sphere.

In Second Life, for example, the environment is constructed from graphical primitives and scripts that can be altered very rapidly.

Constancy of environment is the exception rather than the norm.

It is in the virtual world that Marx's famous observation about capitalist modernity reaches fruition: All that is solid melts into air.

Artificial agency refers to the facility with which software agents can be embedded in virtual worlds.

The virtual world is itself a complex program.

So it is relatively easy to introduce into it artificial life and artificial intelligence as responsive and even evolving forms of aesthetic expression.

In Second Life, see the work of Nonnatus Korhonen (Dr. Andrew Burrell) and Glyph Graves.

Because virtual worlds reside on severs connected to the Internet, they offer unprecedented opportunities for networked collaboration.

Such collaboration, between artists as well as artists and audiences, can involve formidable organizational and aesthetic problems.

However, never before has art been capable of such globalized collectivity.

Five of the six dimensions of virtual worlds characterize the worlds Alice enters in Carroll's books.

With her fall through the rabbit hole, with its long, detailed descent, Alice is immersed in Wonderland.

The immersion is repeated on other occasions - for example, when she swims in an ocean of her own tears.

Alice learns to interact with objects according to strange rules of causality - the mushroom whose opposite sides make her bigger or smaller; the croquet game where mallets are flamingos and balls are hedgehogs..

Ambiguity of identity: "Who are you?" asks the caterpillar.

Alice replies: "I hardly know… I know who I was when I got up this morning, but I think I must have been changed several times since then."

Talking caterpillar, Cheshire Cat, playing card knights, animate chess pieces, March Hare, Humpty Dumpty - all forms of artificial agency.

The only dimension of virtual worlds unrepresented in *Alice* and *Through the Looking Glass* is networked collaboration.

This is because, at least in global form, networked collaboration first becomes possible with the Internet.

Still, it's remarkable just how deep the metaphor of the virtual looking glass goes.

We can read Carroll's books as literary anticipations of the virtual worlds made possible by computer networks.

Sutherland, Carroll, Deleuze, and Husserl form a quartet of thinkers indispensable for understanding the art of virtual worlds.

Husserl: lifeworld as horizon of sense. Carroll: sense as paradox. Sutherland: computer as looking glass. Deleuze: reality as mirror or crystal, in other words, as actual-virtual pairs.

Analysis of Artworks

New Media theorists often attribute to Marshall McLuhan the insight that every new medium begins by interpreting itself on the model of its predecessors.

In fact this is merely a specific version of a more general insight attributable to German theorists of hermeneutics and the aesthetics of reception (Gadamer, Jauss).

All interpretation of texts, art objects, cultural practices, indeed anything imbued with a foreign or obscure significance, proceeds by way of the gradual modification of prejudices.

There is no presuppositionless starting point when it comes to our encounter with the Other.

In the history of new media, this principle has meant that artists only gradually discover the unique expressive potentialities of a new technological medium.

Thus the earliest photographers shot historical and mythical scenes in studios in emulation of academic painting, and the first filmmakers kept their movie cameras stationary in accordance with the older photographic practices.

It takes time and considerable experimentation to discover the unique dimensions of art produced in a new technological medium.

The art of virtual worlds (at most a decade or so old) has followed this pattern, tending to fall back in its initial stages on earlier filmic, photographic, painterly, sculptural, and architectural models.

This initial phase is now coming to an end as virtual artists begin to explore the unique dimensions of their medium.

I have chosen the work of six virtual artists or artist-teams to illustrate the six dimensions of the art of virtual worlds:

1) Four Jetpacks - Bryn Oh - Immersion
2) BableSwarm - Adam Nash - Interaction
3) Identity Circus - Botgirl Questi - Ambiguity of Identity
4) Surrealist Dancehall - Pixels Sideways (Project Director) - Environmental Fluidity
5) Mellifera - Andrew Burrell/Trish Adams - Artificial Agency
6) Field of Voices - Aequitas - Networked Collaboration

An important caveat: Most virtual artworks involve, illustrate, or employ more than one of the six dimensions.

I have chosen the six works, not because they are exclusively devoted to a single dimension, but rather because each of the six works gives one of the six dimensions a special salience.